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(54) **Motorcycle tyre tread**

(57) A tyre for a motorcycle has a tread surface 10 in which are recessed a plurality of channels none of which extend around the entire circumference of or across the entire width of the surface 10 and at least some of which (e.g. 12, 14, 22, 24) are entirely surrounded by surface 10. The illustrated tread has a series of channels 12 inclined at an equal and opposite angle to a circumferential line of the tyre 8 and circumferentially staggered relative to the channels 14 of another series. Two additional series of channels 22, 24 extending at approximately 90° to the channels 12, 14 respectively are also provided, as are channels 38 opening into the tread edges. In alternative embodiments all channels are bounded by surface 10, and substantially Z-shaped channels are provided.

Fig.2.

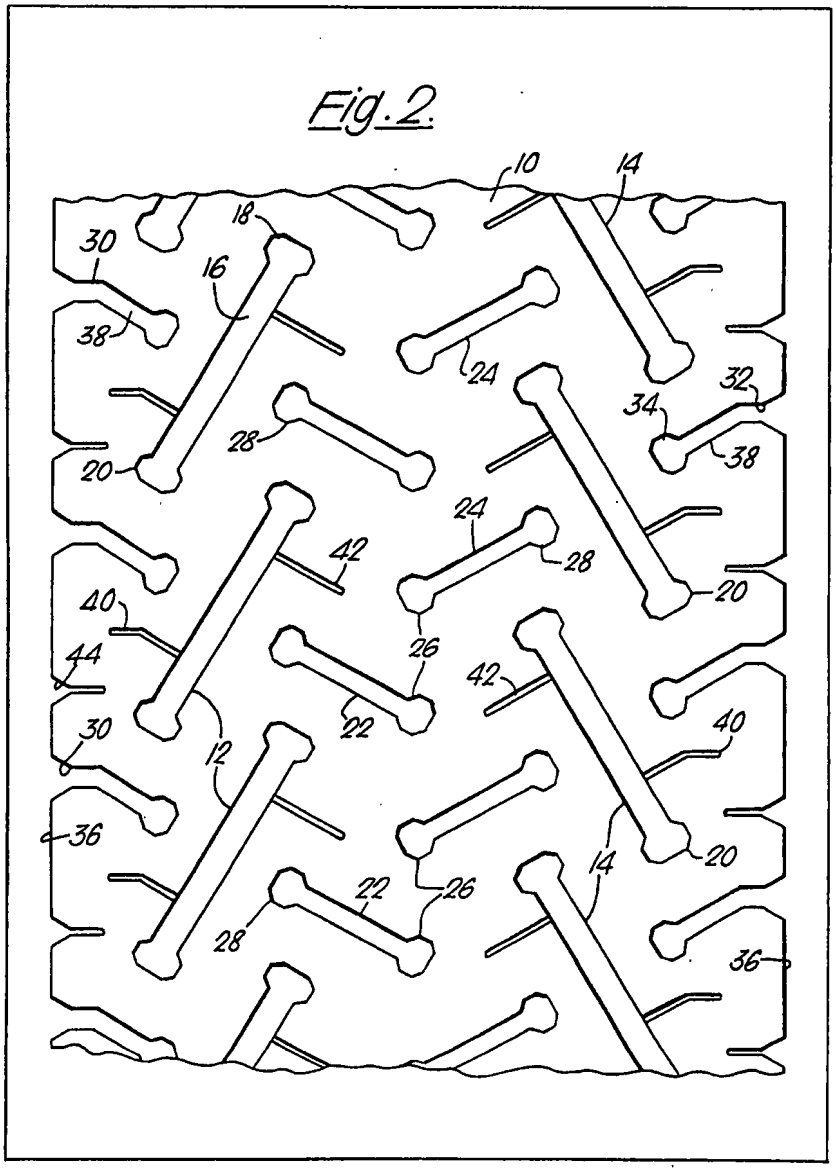


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Fig. 1.

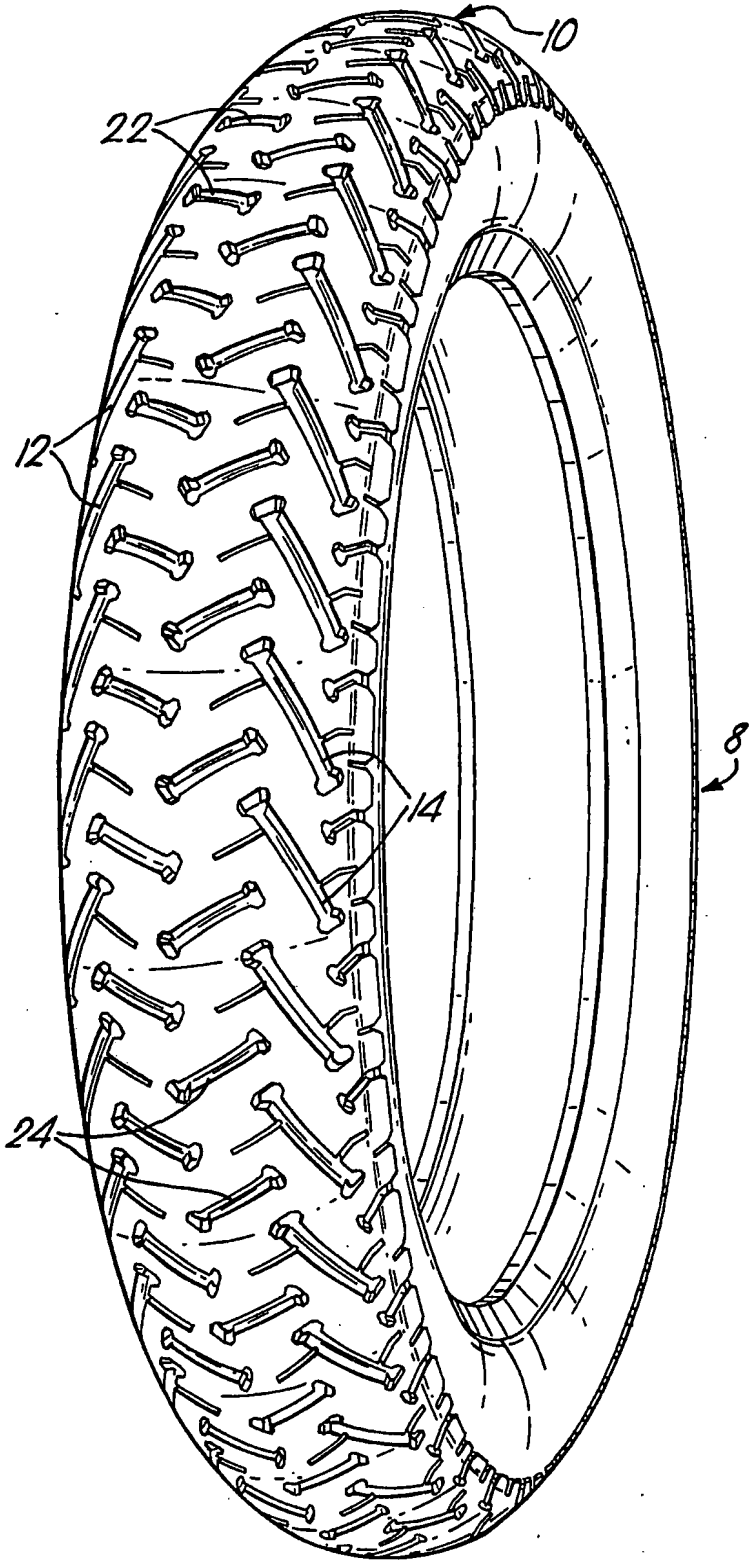

Fig. 2.

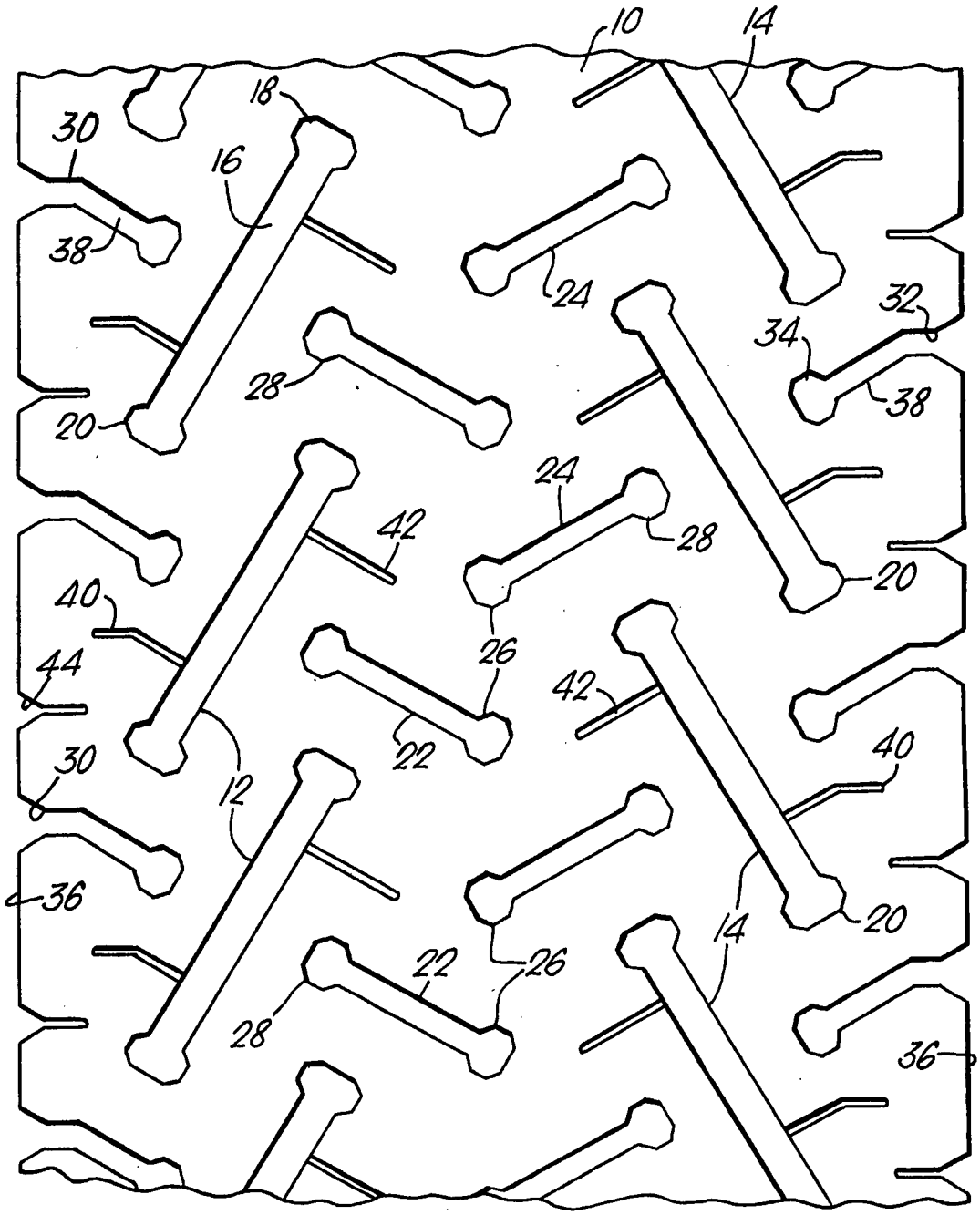
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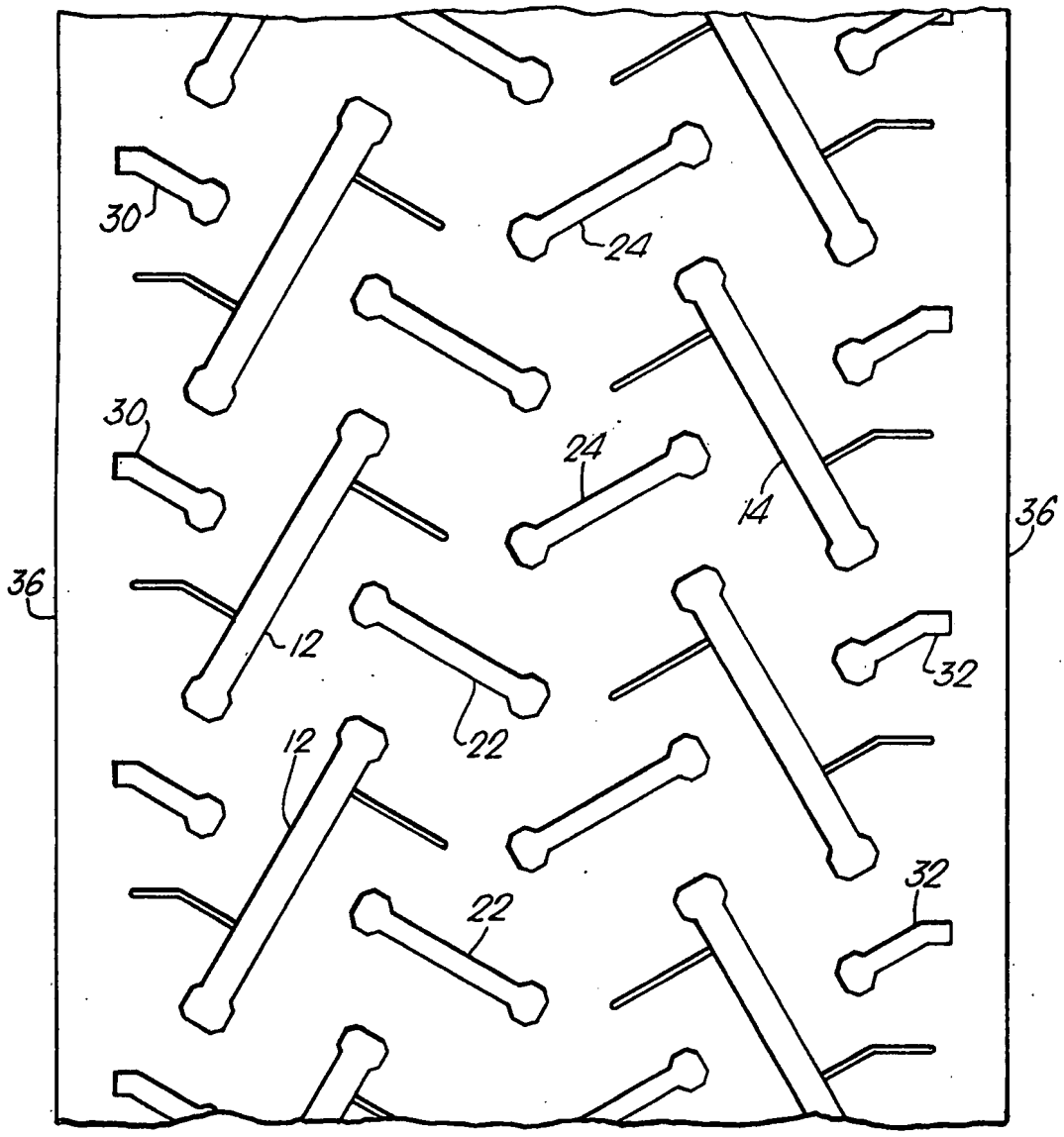
Fig. 3.



SPECIFICATION

**Tyre**

The present invention relates to treads for tyres.

Tyre treads are provided with grooves or channels to permit water to escape from the ellipse of contact between the tyre and the surface on which it rests. This prevents a film of water forming between the tyre and the surface on which it rests; such a film would cause aquaplaning of the tyre when it is moving at anything other than very low speeds. The conventional type of configuration for such grooves has circumferential grooves extending around the tyre, and lateral grooves may also be provided extending across the tyre tread.

Known configurations of channels in the tyre tread divide the tyre tread into a plurality of ribs and/or blocks of tread material. Such ribs and/or blocks are flexible to a greater or less extent depending on the pattern of the ribs and blocks so that they move relative to each other when the tread is subject to the forces generated by accelerating, braking or cornering of the vehicle bearing the tyre. This relative movement causes irregular wear of the tyre, which shortens its life and reduces the stability of the vehicle.

This problem is of great relevance when the tyre is used on a motorcycle. Such vehicles are very sensitive to loss of stability and even a very small degree of irregular wear causes a reduction of the perceived stability of the motorcycle. Also, there has been an increase in the efficiency and power of motorcycle engines so that the forces generated on the ribs and/or blocks of tread of the rear wheel have increased. Hence the problem of uneven wear of that wheel is particularly acute.

It has now been found that a motorcycle tyre with isolated non-continuous channels may be designed so that the problem of uneven wear due to movement of tread blocks is overcome or at least substantially reduced, but which permits water to escape from the ellipse of contact.

A balance between the conflicting requirements of water escape and stiffness of the tread blocks is achieved by suitable configuration of the size and arrangement of the channels. The channels may all be of the same size but preferably are of at least two different sizes. Also, the channels may be inclined to a circumferential line of the tyre. If there are two or more different channel sizes, channels of different sizes may be inclined at different angles to the circumferential line.

A preferred shape of the channels (or of most of these) is a dumbell or "dog-bone" shape.

It is desirable for the arrangement of channels to extend over the entire tread surface of the tyre. This is particularly important in the case of a motorcycle tyre as the ellipse of contact of the tyre has a greater degree of movement. A motorcycle banks around corners causing the ellipse of contact to move to one side of the tyre tread and the banking causes large lateral forces to be applied to the tread pattern. Therefore, the tyre should exhibit the advantages of the channel arrangement over substantially the whole of the tyre tread, as stability during all manoeuvres is vital for a motorcycle.

The size and position of the ellipse of contact also varies depending on the loading on the tyre, and it is desirable that the channel arrangement is able to accommodate this.

Embodiments of the invention will now be described in detail, by way of example, with reference to the accompanying drawings, in which:

Figure 1 shows a perspective view of a motorcycle tyre embodying the present invention;

Figure 2 is a developed view of the tread of the tyre of Figure 1;

Figure 3 shows a developed view of a tread of a modification of the tyre of Figures 1 and 2; and

Figure 4 is a developed view of the tread of a second embodiment of the present invention.

Referring first to Figure 1, a motorcycle tyre 8 has a tread surface 10 provided with two series of channels 12, 14 respectively extending around the tyre. Each channel 12, 14 has an elongate part 16 terminating at each end in a short part 18, 20 respectively wider than the elongate part 16. The short part 18, 20 may be rounded or angular as shown in the drawing. Thus each channel has a dumbell or "dog-bone" shape. The channels 12, 14 of each series are inclined at equal and opposite angles to a circumferential line of the tyre and the channels 12 of one series are circumferentially staggered relative to the channels 14 of the other series. These channels 12, 14 are sufficiently long to drain water out of the ellipse of contact of the tyre.

Two additional series of channels 22, 24 are also provided in the tyre tread. These channels 22, 24 have a similar dog-bone shape to the channels 12, 14 but are smaller in size, e.g. the ratio of the length of the large channels 12, 14 to the length of the smaller channels being about 1.5:1. The channels 22, 24 are also inclined at equal and opposite angles to a circumferential line of the tyre. One series of these channels 22 is circumferentially staggered relative to the other series of channels 24. Thus the tyre tread 10 has a staggered but otherwise symmetrical arrangement of channels and the four series of channels are paired so that the channels 12 are adjacent the channels 22 and the channels 14 are adjacent the channels 24.

One end 26 of each of the smaller channels 22, 24 lie on the central line of the tyre tread 10, whilst the other end 28 lies on the line passing through one end 18 of the corresponding series of larger channels 12, 14, and is midway between the ends 18 of two adjacent larger channels 12, 14 in the series. The smaller channels 22, 24 extend at approximately 90° to the corresponding larger channels 12, 14.

Each edge of the thread 10 has a series of channels 30, 32 of "half dog-bone" shape. Their wider part 34, is inward of the tread edge 36 and the elongate part 38 extends to that edge 36.

Thus as can be seen from the figure, each of the larger channels 12, 14 has one of the smaller channels 22, 24 and one of the edge channels 28, 30 on opposite sides, with each corresponding channel 22, 28 or 24, 30 extending along a common line so that they are inclined at about 90° to the longer channel 12, 14 respectively. The wider part 32 of each of the edge channels 30, 32 lies on a line intersecting the outer ends 20 of the longer channels 12, 14 respectively and approximately midway between adjacent channels 12, 14 in each series.

Thus a tread configuration is produced with a plurality of separate, discrete, channels extending in different directions, to remove water from the ellipse of contact. The channels are not interconnected, even by grooves of lesser depth than the channels themselves. None of the channels intersects any other channel and the spacing between the various channels is maximised so that the flexibility of the tread material (rubber) is reduced as against a conventional design.

Grooves 40, 42 extend from the larger channel 12, 14 but these do not intersect any other channel. Grooves 44 are also provided adjacent the edges 36 of the tread 10.

Figure 3 shows a modification of the thread configuration of Figures 1 and 2 in which the "half dog-bone" channels 30, 32 terminate short of the tread edge 36. Also the grooves 44 are omitted. The ratio of the length of the larger channels 12, 14 to the length of the half dog-bone channels is about 3:1. Otherwise this configuration is identical to that of Figure 2. The configuration of Figure 3 has all channels bounded by the tread surface 10 and is preferable for a motorcycle because there is no movement of tread blocks adjacent the edges 36 of the tread 10 as may occur in the embodiment of Figure 2 when the motorcycle banks steeply.

Referring now to Figure 4, the second embodiment of the present invention, the tyre tread 110 has two series of channels 112, 114 respectively, extending around the tyre in a manner similar to the channels 12, 14 of the embodiment of Figures 1 and 2. Again, each channel 112, 114 has an elongate part 116 with the channels 112, 114 of each series inclined at equal and opposite angles to a circumferential line of the tyre with the channels 112 of one series being circumferentially staggered relative to the channels 114 of the other series.

However, in the embodiment of Figure 4 the elongate part 116 of the channels 112, 114 extends from the centre line of the tyre tread 10 to a point close to the tread edge 136. Also the channels 112, 114 terminate in short parts 118, 120 which are of the same width as the elongate part 116 of the channel but are angled to that elongate part 116 so that they extend in opposite circumferential directions along the tyre tread 110. Thus, in this embodiment the channels have a "lazy-Z" shape. The short parts 118 of the channels 112, 114 of the two series are aligned in the same direction and lie along the centre line of the tread.

Four additional series of channels 122 to 125 are provided in the tyre tread, in two pairs 122, 123 and 124, 125 on each side of the tread 110. Each of these channels is formed by two short sections, one part 126 extending circumferentially of the tyre and one part 128 extending across the tread 110 parallel to the elongate parts 116 of the channels 112, 114. The parts 128 of each pair 122, 123 and 124, 125 are aligned and also aligned with the inner end of the elongate part 116 of the corresponding main channel 112, 114 on the opposite side of the tread. The channels 122, 123 are aligned in a parallel configuration with the channels 114 and similarly the channels 124, 125 are aligned with the channels 112. The total length of the larger channels 112, 114 to the length of the smaller channels 122, 123, 124, 125 is about 5:1. Thus the tyre tread 110 has a staggered but otherwise symmetrical arrangement of channels. The removal of water from the ellipse of contact is achieved by the channels 112, 114 and the channels 122, 123, 124, 125 can be omitted if desired.

Thus, the tread again has isolated, non-continuous channels permitting water escape without excessive tread wear. It is particularly of value for high speed uses on motorcycles.

CLAIMS

1. A motorcycle tyre having a tread surface to provide the running surface of the tyre and a plurality of isolated channels recessed in the tread surface, at least some of the channels being entirely bounded by the tread surface, and none of the channels extending around the entire circumference of the tyre or across the entire width of the tread surface.

2. A tyre according to Claim 1, wherein the channels entirely bounded by the tread surface are inclined relative to the central circumferential line of the tyre.

3. A tyre according to Claim 1 or Claim 2, wherein the channels are divided into two sets of channels, each set forming a regularly repeating pattern around the tyre, one set on each side of the central circumferential line of the tyre and the pattern of channels of one set circumferentially off-set relative to the pattern of channels of the other set.

4. A tyre according to any one of the preceding Claims, wherein the channels are of at least two different sizes.

5. A tyre according to Claim 4, wherein the smaller channels are circumferentially between the larger channels in the tread surface.

6. A tyre according to Claim 4, wherein the smaller channels extend inwardly of the larger channels.

7. A tyre according to any one of Claims 4 to 6, wherein the smaller channels are approximately perpendicular to the larger channels.

8. A tyre according to any one of Claims 4 to 6, wherein the smaller channels are approximately

parallel to the larger channels.

9. A tyre according to any one of the preceding Claims, wherein there is a continuous zig-zag path on the tread surface from one of the edges of the tread surface to the other edge thereof.

10. A tyre according to any one of the preceding Claims, wherein at least one channel extends out of the ellipse of contact of the tread surface on another surface in use.

11. A motorcycle tyre substantially as herein described with reference to and as illustrated in Figures 1 and 2, or Figures 3 and 4 of the accompanying drawings.

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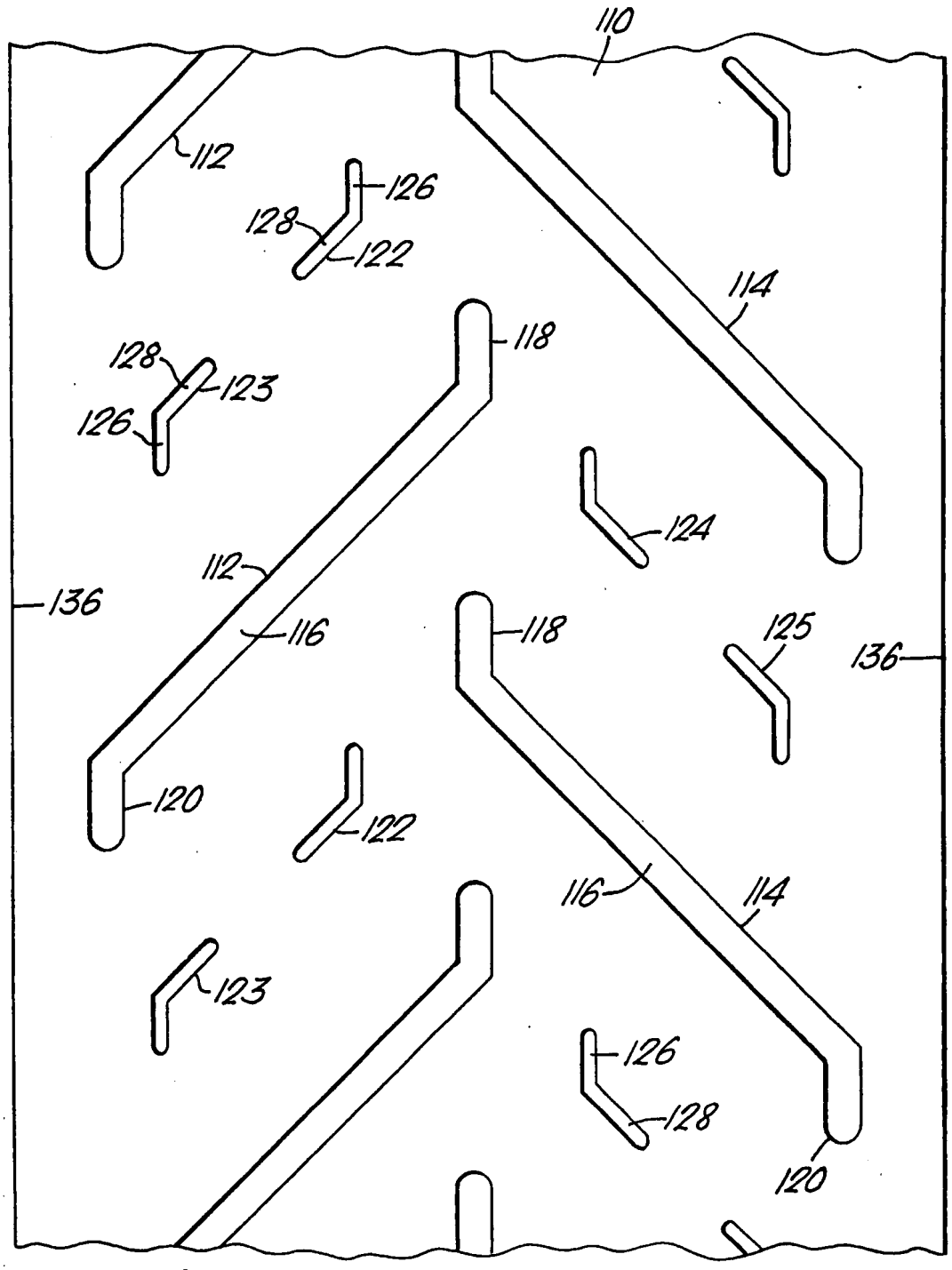
Fig. 4.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